1 Introduction

In navigable waterways, owing to the relatively short fetches for wind wave generation, the free waves generated by moving vessels often produce the dominant wave action for design. In the past, several laboratory and field vessel wave measurement programs have been carried out. Based on the data from these studies, a number of empirical vessel wave prediction models have been developed. Some models have partial theoretical support. Most models are based on limited data and apply only to certain vessel types and waterway conditions. All suffer from certain limitations such as inadequate definition of the vessel bow geometry.

The objective of this report is to evaluate the literature on vessel-generated waves and, based on the literature, to present the best available model(s) for vessel wave prediction with an emphasis placed on the types of vessels that operate on the Upper Mississippi River System (UMRS).

Chapter 1 provides a review of the vessel wave-generating mechanism and the resulting pattern and characteristics of the waves generated by a moving vessel. Chapter 2 presents the available predictive models for vessel-generated waves. This chapter also evaluates those models based both on their method of development and on comparisons with appropriate field data. Chapter 2 is followed by a chapter that discusses the applicability of these models to the recreational vessels common to the UMRS. Chapter 5 summarizes the report and recommends work to be carried out to improve vessel wave prediction procedures. Appendix A is an annotated bibliography of the available literature on vessel-generated waves.